7TH

PALM OIL SEMINAR SERIES

COMMERCIAL • TECHNICAL • SUSTAINABILITY

Tuesday, September 22nd

8:00 am to 12:30 pm

Hilton Garden Inn Montreal Centre-Ville

380 Sherbrooke St. West, Montreal, Quebec

GLOBAL AGRI-TRADE CORPORATION

MPOB

MPOC

Natu'oil SERVICES INC

PALM OIL: PRODUCTION, PROCESSING, PRODUCTS AND PROPERTIES

CONTENTS

- About MPOB
- Palm Oil 101
  - Production
  - Processing
    - Milling
    - Refining
    - Fractionation
    - Blending
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  - Properties
  - Nutritional Properties
- Facts about Palm Oil

Ministry of Plantation Industries and Commodities - Structure

MINISTER

- Deputy Minister I
- Deputy Minister II
- Secretary General
  - Deputy Sec. General Plantation & Commodities
    - **Malaysian Palm Oil Board - MPOB**
    - Malaysia Rubber Board - MRB
    - Malaysian Timber Industry Board
    - Malaysian Cocoa Board
    - Malaysian Pepper Board
    - Malaysian Kenaf & Tobacco Board
  - Deputy Sec. General Strategic Planning & Mgt.
    - **Malaysian Palm Oil Council - MPOC**
    - MREPC
    - MTC
    - MTCC
    - MFPC

MPOB MAIN FUNCTIONS

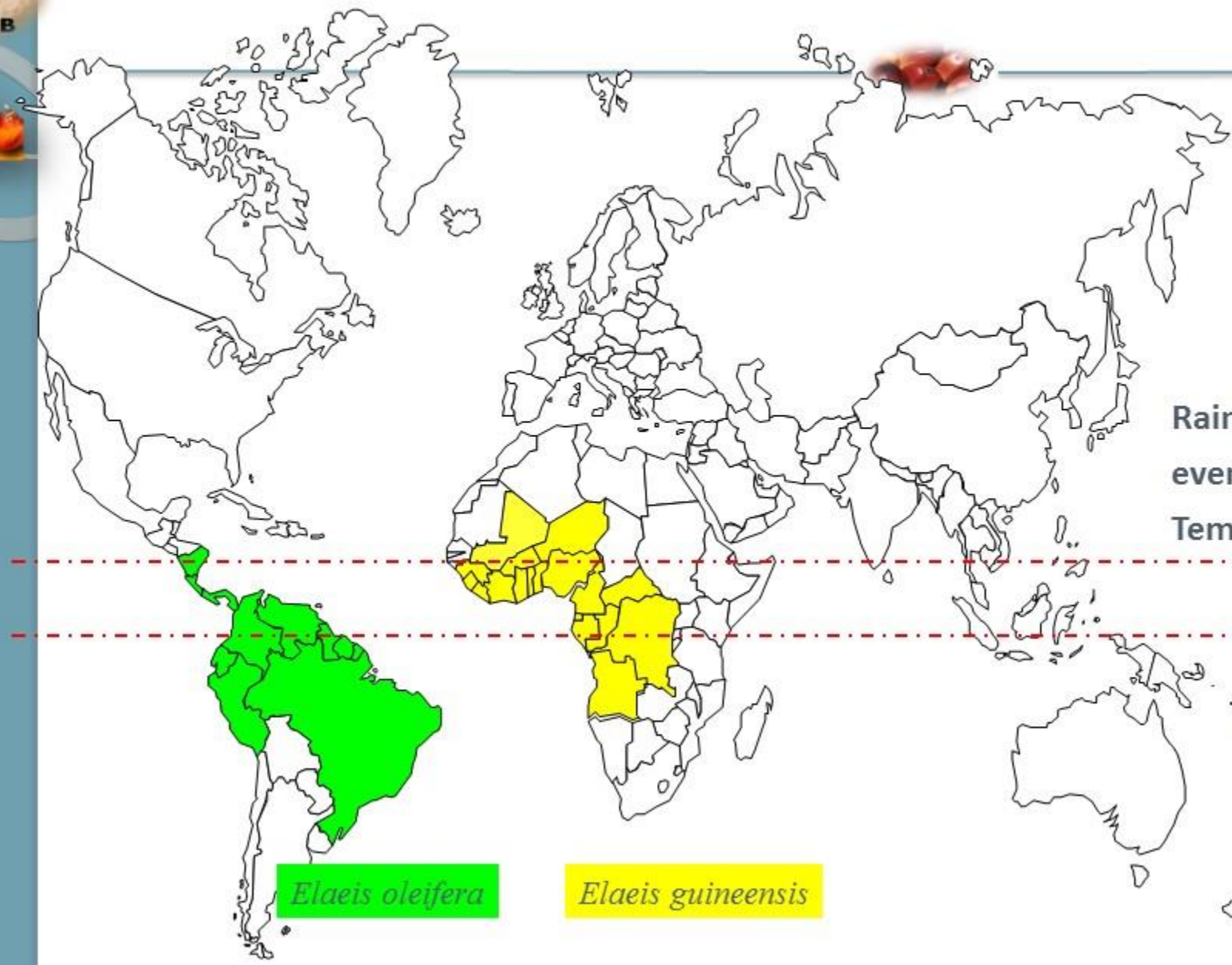
- Implement Policies and Development Programmes for Viability of Oil Palm Industry
- Conduct and Promote Research and Development (R&D)
- Regulate, Register and Promotes All Activities related to Oil Palm Industry
- Provide Consultancy and Advisory Services
- Commercialization of Research Findings
- Develop Training Programme
- Resource and Information Centre


Brussels
Washington DC
Cairo
Karachi
Shanghai
Mumbai
Kuala Lumpur

ADVISORY SERVICES OFFICES

- Technical Support
- General Advisory Services
- Product Technology Transfer
- Training – POFP, Seminars, Etc
- Consultancy
- Trouble Shooting

ORIGIN OF OIL PALM



Rainfall: 1500-2000 mm/year, evenly distributed

Temperature: min 22-24°C max 29-33°C

Sunshine: continuous 5 hours/day

Soil: loose-textured, no hard layer

ELAEIS GUINEENSIS

X

ELAEIS GUINEENSIS

- Species: *Elaeis guineensis*
- Type: Tenera (DXP)
- Planting density: 148 palm/ha
- Nursery period: 24 months
- Economic Life: 25 years
- Palm Height: 2.3 meters
- Harvesting interval: 15 days
- No. of bunches/yr: 19

ELAEIS GUINEENSIS

- **Bunch weight: 10-15 kg**
- **Fruitlets/bunch: 1000-3000**
- **Oil/bunch: 22-25%**
- **Kernel/bunch: 4%**
- **Kernel production/year: 8kg**
- **Oil production/year: 42.5 kg**

ELAEIS GUINEENSIS

- **Fruit shape: Oval**
- **Fruit size: 5 cm**
- **Fruit weight: 10 g**
- **Mesocarp/fruit: 83%**
- **Oil/dry mesocarp: 75%**
- **Kernel/fruit: 7%**

OIL PALM MILL

OIL EXTRACTION AT THE MILL

CRUDE PALM OIL

FFBs enter the mill
For processing

Sterilization in large
Pressure vessel/cages

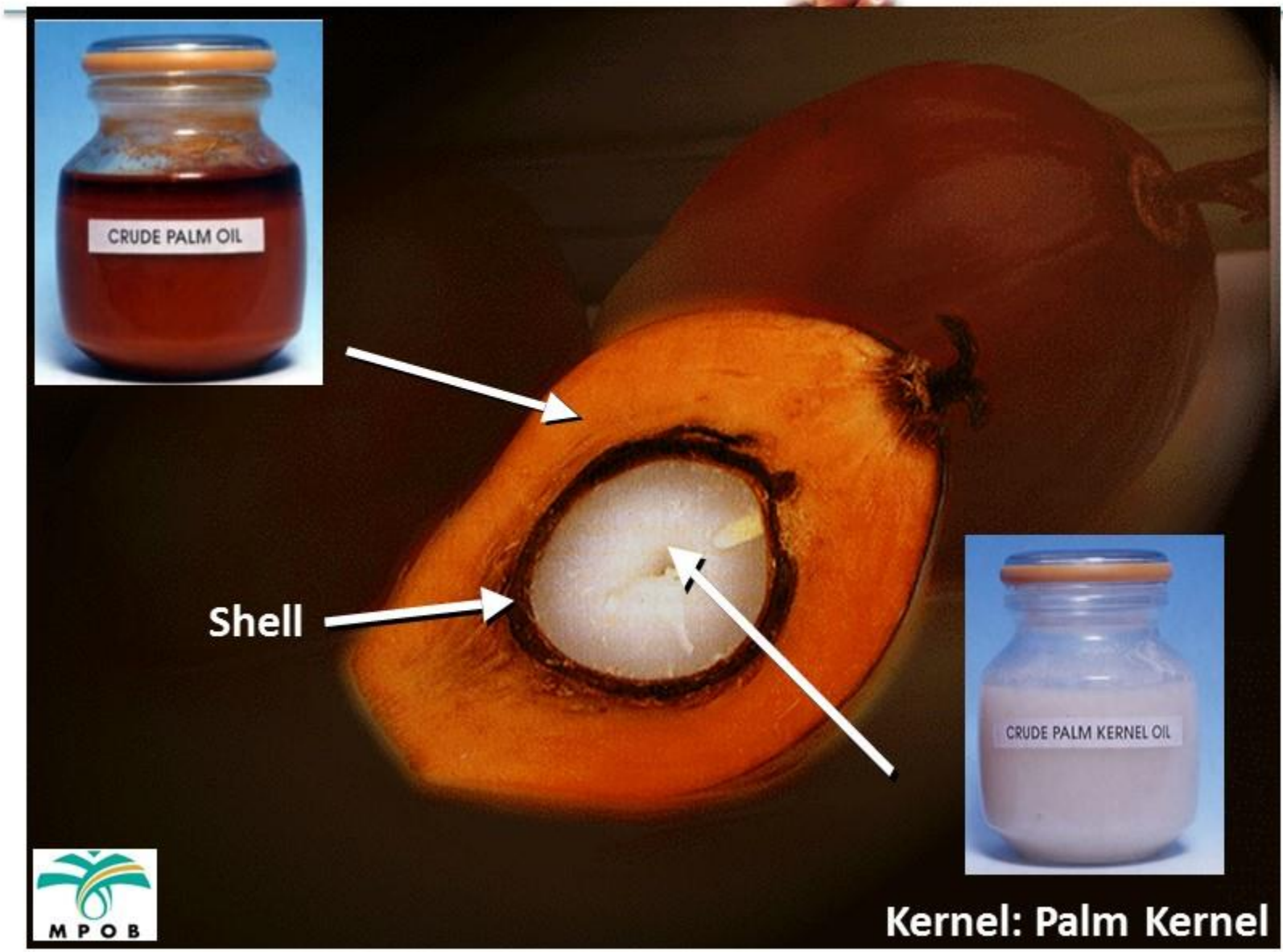
Stripping in
Rotating drum
stripper

Extraction in a
Homogeneous
oil mesh

Purification in a
continuous
clarification tank

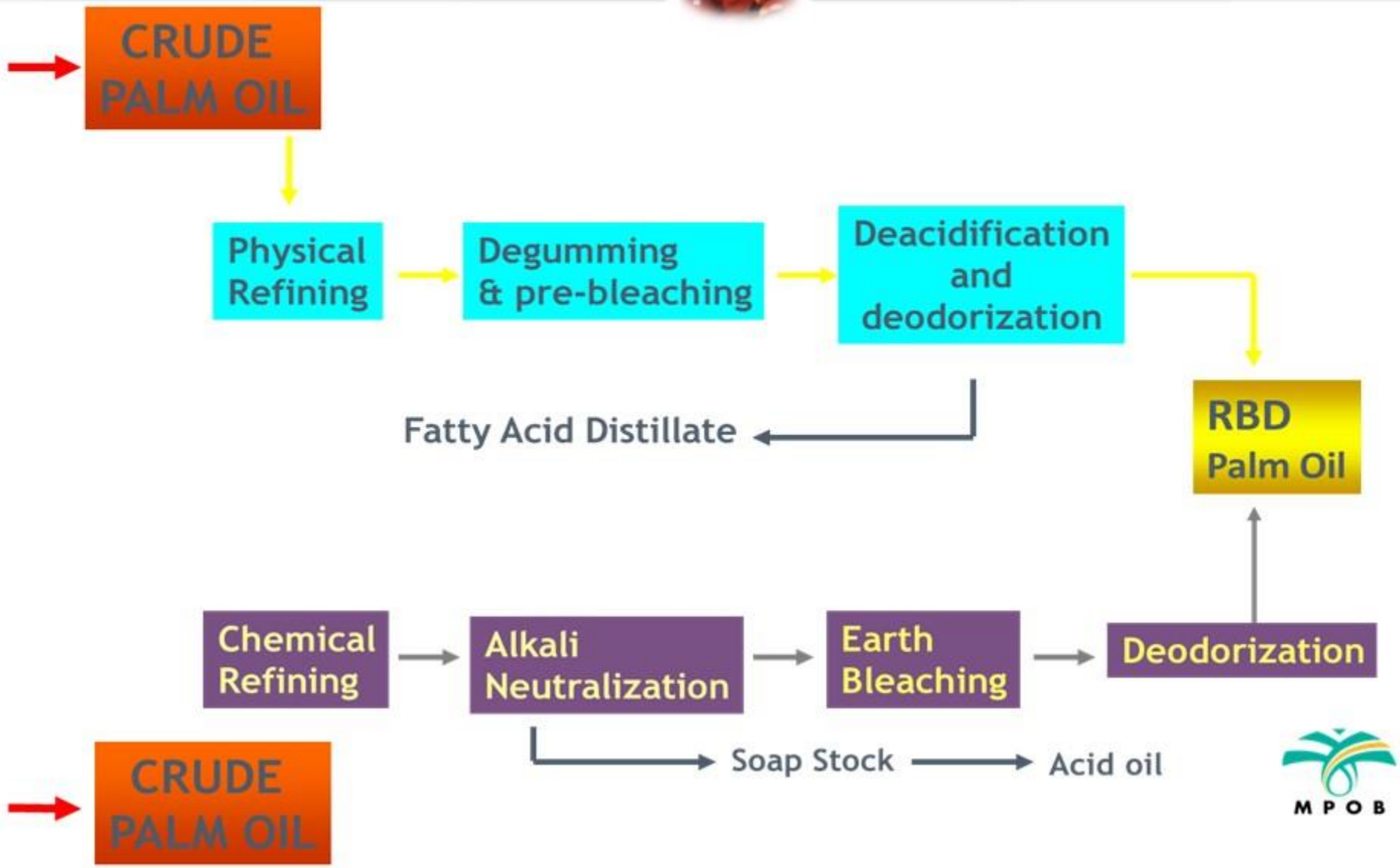
PALM KERNEL

OIL PALM FRUIT




CRUDE PALM OIL
CRUDE PALM KERNEL OIL

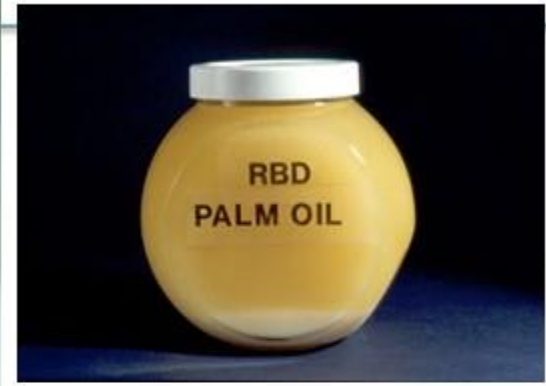
REFINING OF CRUDE PALM OIL



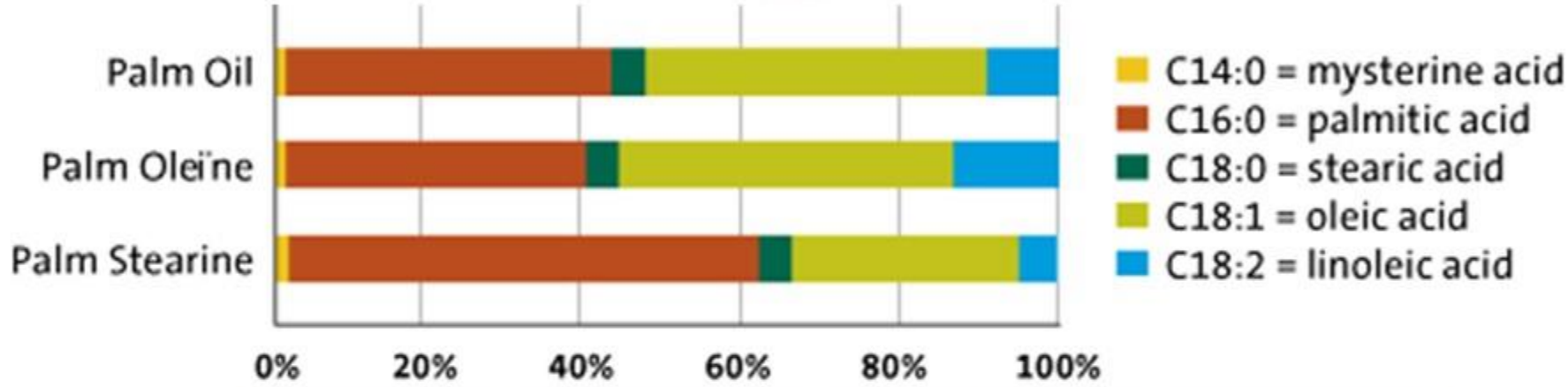
REFINING OF PALM OIL

FRACTIONATION OF PALM OIL

FRACTIONATED PALM & PALM KERNEL OIL PRODUCTS

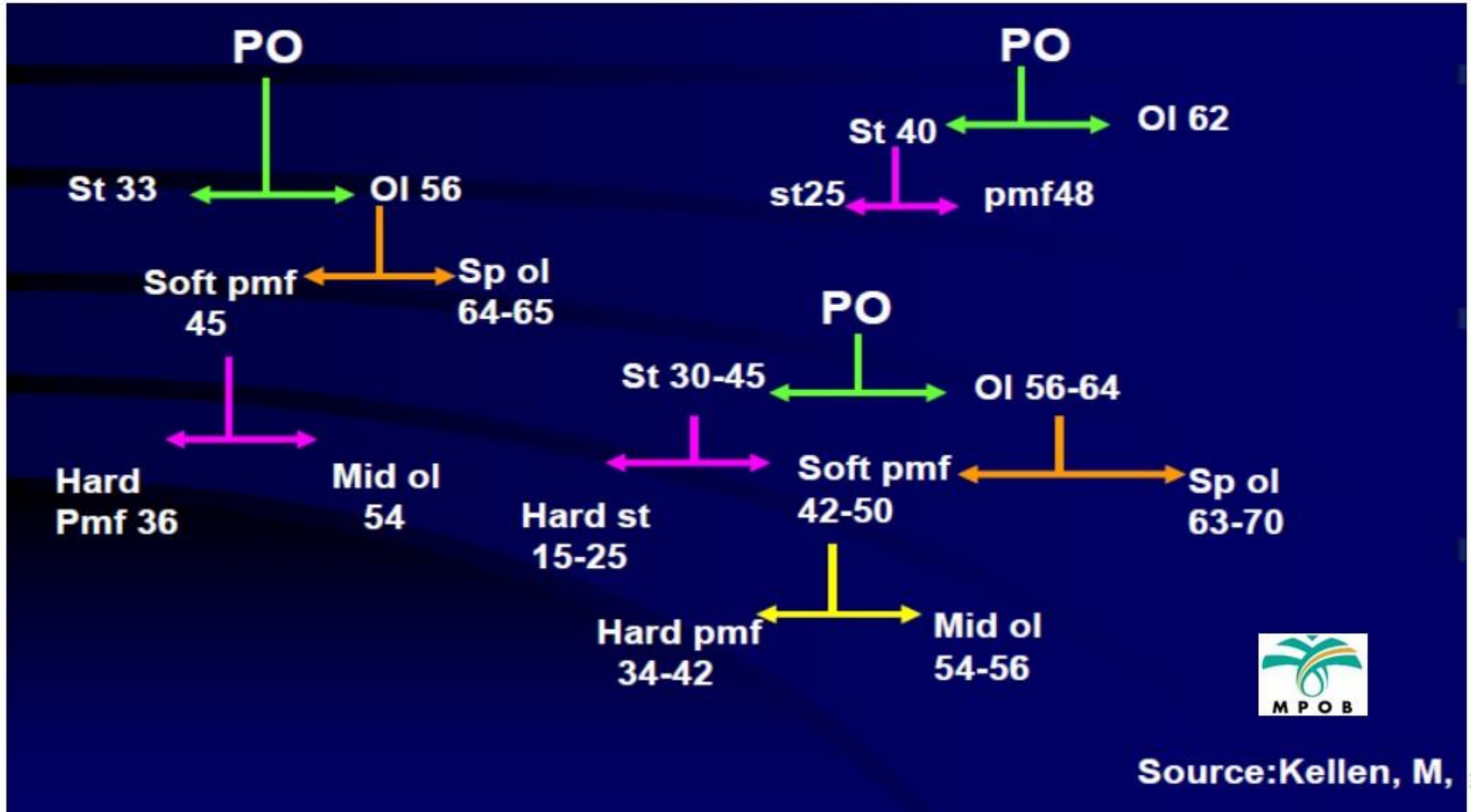


FATTY ACID COMPOSITION OF PALM OIL AND FRACTIONS



Fatty Acid	Palm Oil	Std. Palm Olein	Special Palm Olein	Palm Stearin
C14:0	1.1	1.0	1.1	1.3
C16:0	44.4	39.8	31.5	54.0
C18:0	4.5	4.4	3.2	4.7
C18:1	39.2	42.5	49.2	32.3
C18:2	10.1	11.2	13.7	7.0
C18:3	0.4	0.4	0.3	0.1
Iodine Value	53	58	66.4	39.9
Melting Pt. (°C)	36	21.6	12.0	51.3
Could Point (°C)	-	8.8	2.2	-

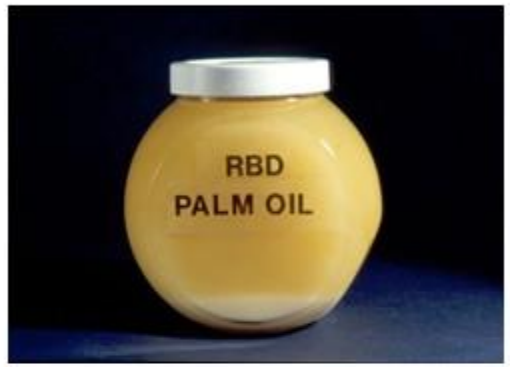
MULTIPLE FRACTIONATION OF PALM OIL



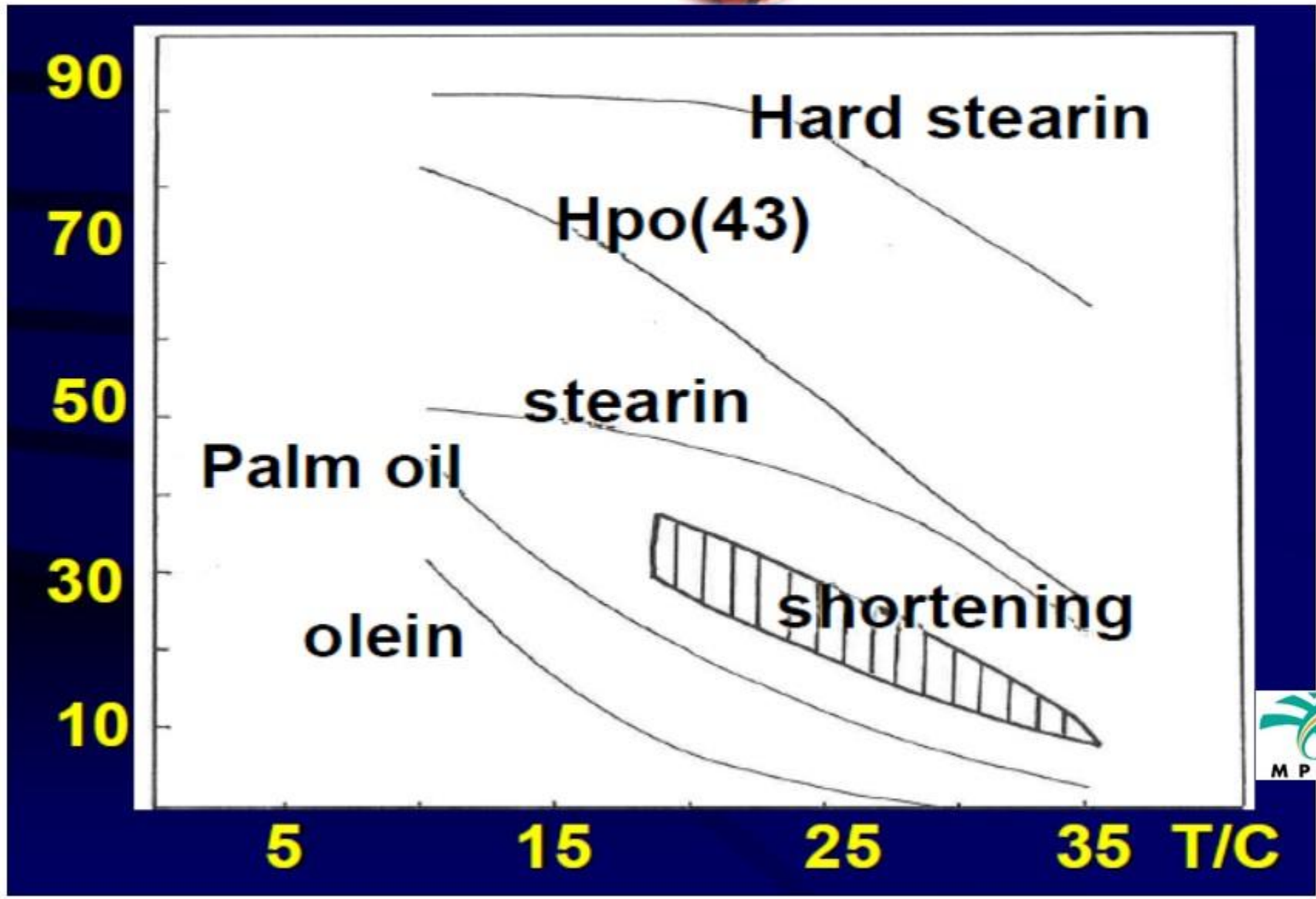
PALM PROCESSING STEPS AND THEIR PRODUCTS

Processing	Products
Milling	Crude fruit palm oil, palm kernel
Crushing	Crude palm kernel oil
Refining	RBDPO,PFAD, PAO, (RBDPKO, PKFAD, PKAO)
Fractionation	Palm oil, Palm olein, Palm stearin, Superolein, hard stearin (Palm oil products)
Double Fractionation	Df Olein, PMF, super stearin (very hard stearin), Soft PMF
Triple Fractionation	Top olein, Mid Olein, Hard PMF
Blending	Various products

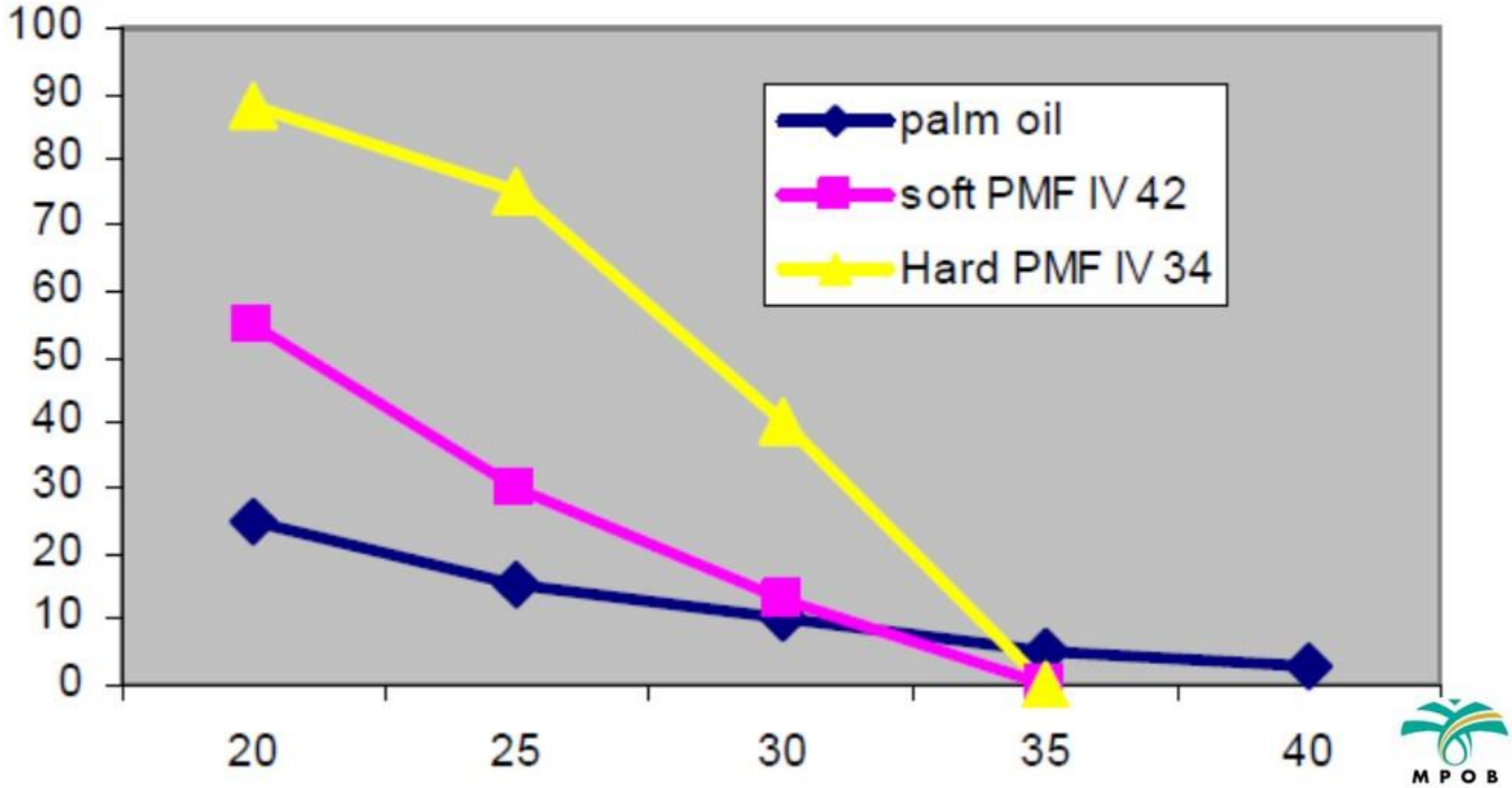
MULTIPLE FRACTIONATIONS



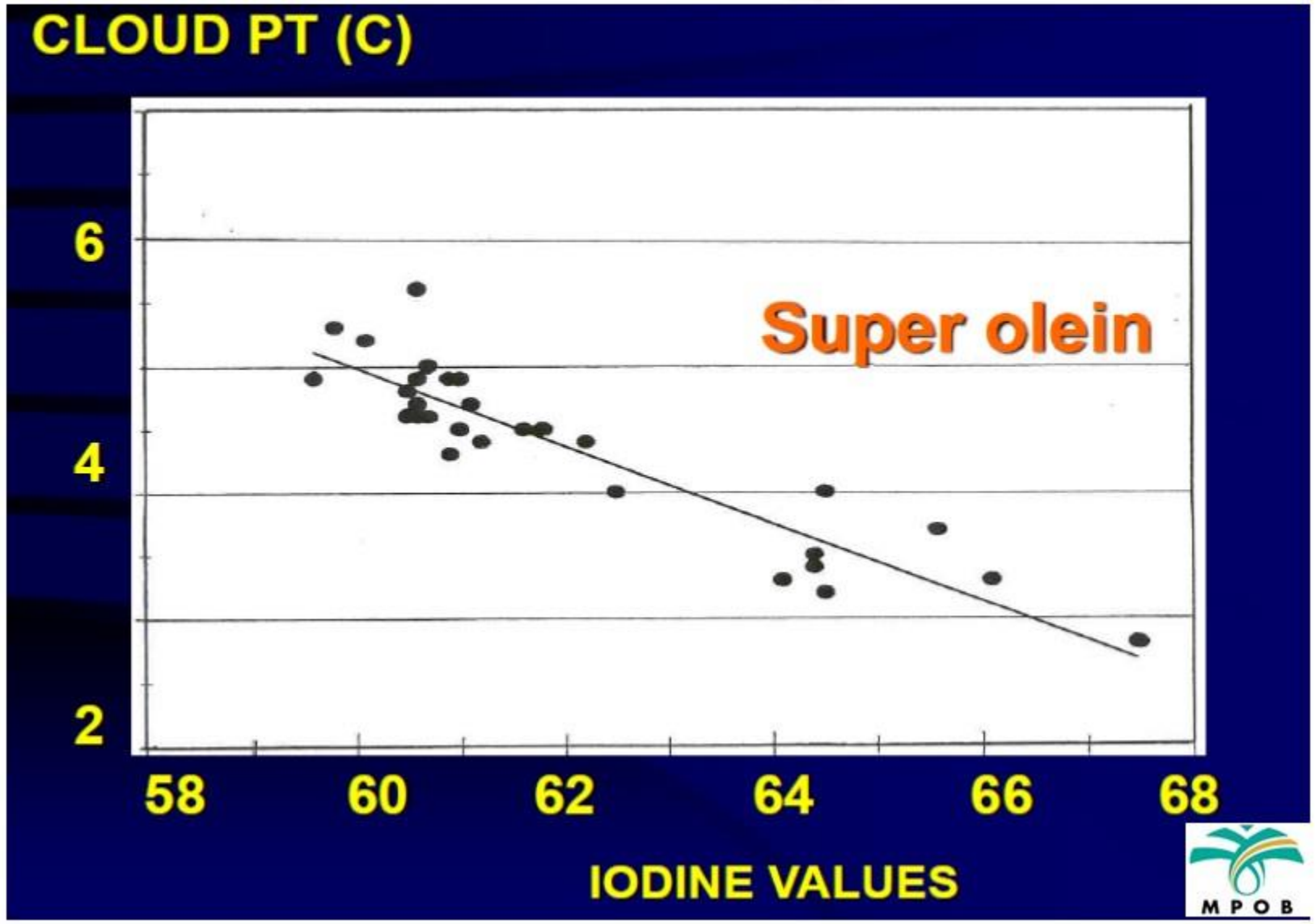
SFC OF PALM PRODUCTS



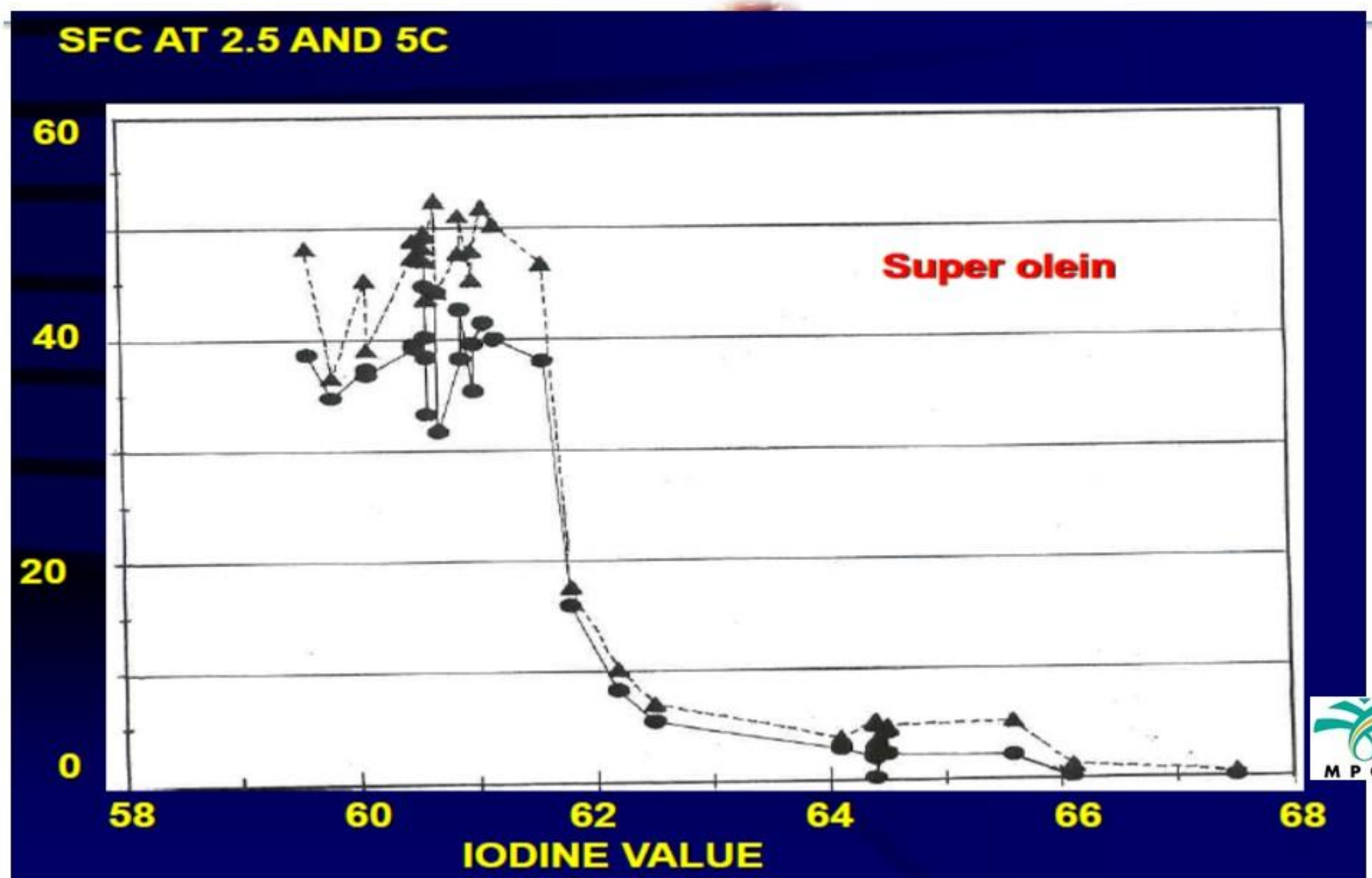
SFC OF PALM PRODUCTS



CLOUD POINT VERSUS IODINE VALUE



SFC VERSUS IODINE VALUE

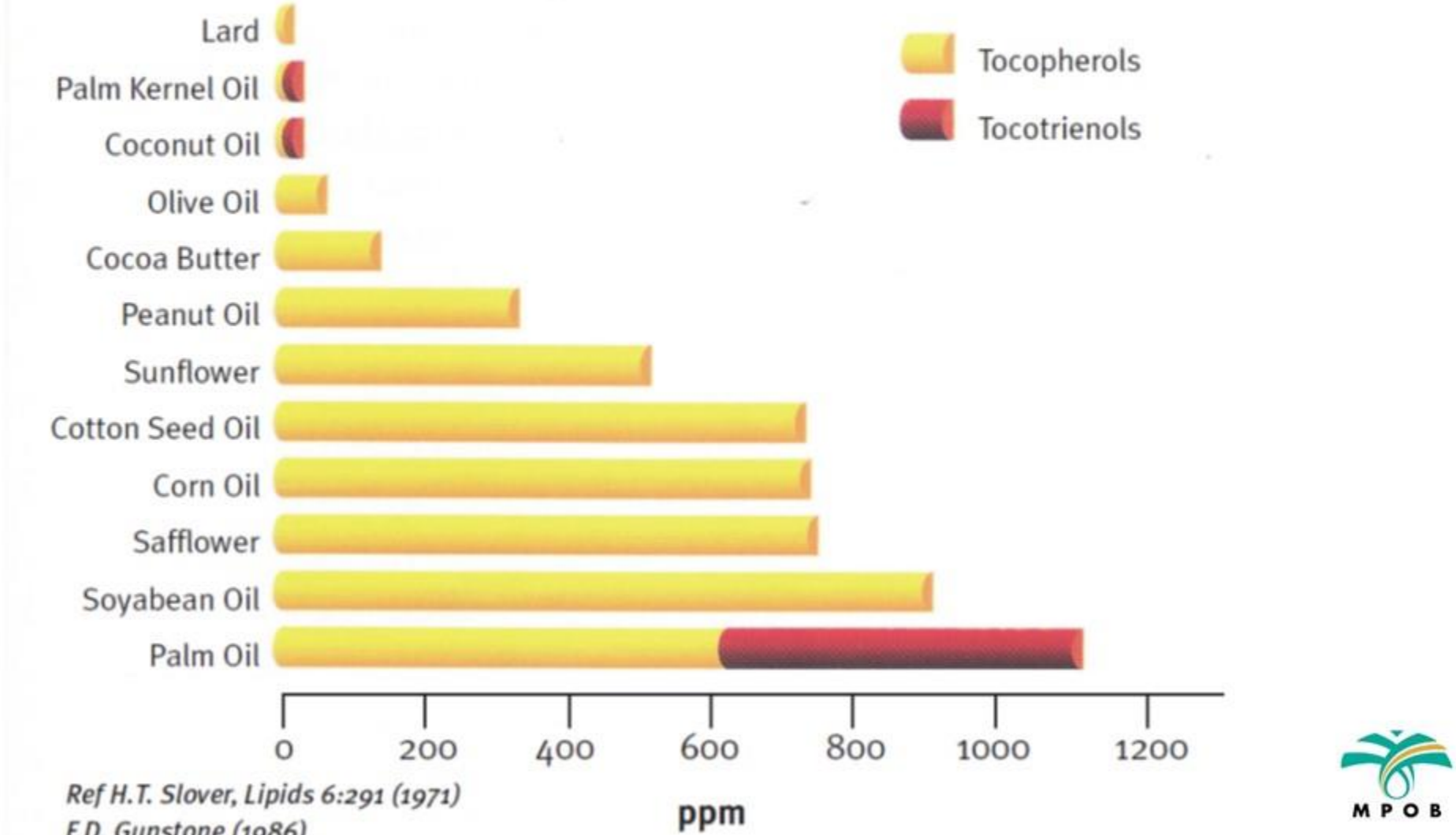


MALAYSIA: RANGE OF PALM OIL PRODUCTS EXPORTED

Palm Oil Products	Palm Kernel Oil Products	Oleochemicals
Crude Palm Oil	Crude Palm Kernel Oil	Oleic Acid
Crude Palm Olein	Crude Palm Kernel Stearin	Palmitic Acids
Crude Palm Stearin	RBD Palm Kernel Oil	Glycerine
Neutralised Palm Oil	RBD Palm Kernel Olein	Lauric Acid
Neutralised Palm Olein	RBDH Palm Kernel Oil	Stearic Acid
Bleached Palm Oil	RBDH Palm Kernel Olein	Palm Kernel Methylester
NB Palm Olein	RBDH Palm Kernel Stearin	Caprylic-Capric Acid
NB Palm Oil	NBDH Palm Kernel Oil	Split Palm Stearin Fatty Acid
NBD Palm Oil	NBDH Palm Kernel Olein	Methylester
RBD Palm Oil	NBDH Palm Kernel Stearin	Methylester Residue
NBD Palm Stearin	NBD Palm Kernel Olein	Myristic Acid
RBD Palm Olein	NBD Palm Kernel Stearin	Triple Stearic Acid
Palm Acid Oil	NB Palm Kernel Olein	Fatty Acid
Palm Fatty Acid Distillate	NB Palm Kernel Stearin	Caprylic Capric Acid B
Cooking Oil/Double Olein	NBH Palm Kernel Olein	Palm Stearin Fatty Acid
RBD Hydrogenated Palm Oil	NBH Palm Kernel Stearin	Split Palm Fatty Acid
RBD Hydrogenated Palm Olein	Palm Kernel Fatty Acid	Distillate PKO Fatty Acid
Hydrogenated Palm Olein	Palm Kernel Acid Oil	Split Palm Kernel Fatty Acid
RBD Hydrogenated Palm Olein	Hydrogenated Palm Kernel Oil	Fatty Acid Methylester
Hydrogenated Palm Olein	Hydrogenated Palm Kernel Olien	Residue
RBD Hydrogenated Palm Stearin	Hydrogenated Palm Kernel Stearin	Lauric Fat
Hydrogenated Palm Stearin	Hydrogenated Palm Kernel Fatty Acid	Palm Fatty Acid Residue
Hydrogenated Palm Oil	Neutralised Palm Kernel Stearin	Hydrogenated Stearin Fatty Acid
RBD Hydrogenated Stearin Flake	Bleached Palm Kernel Stearin	Split Hydrogenated Stearin
Refined Palm Oil		Fatty Alcohol
Hydrogenated Palm Fatty Acid Distillate		Split Hydrogenated Palm Fatty Acid

Finished Products	Cocoa-Butter Substitute	Soap
Vegetable. Ghee/Vanaspati	Cocoa-Butter Extenders	Soap Stocks
Margarine	Palm Mid-Fraction	Dough Fats
Shortening	Fat Blend	Soap Noodles

VITAMIN E CONTENTS IN FATS AND OILS



Ref H.T. Slover, Lipids 6:291 (1971)
F.D. Gunstone (1986)

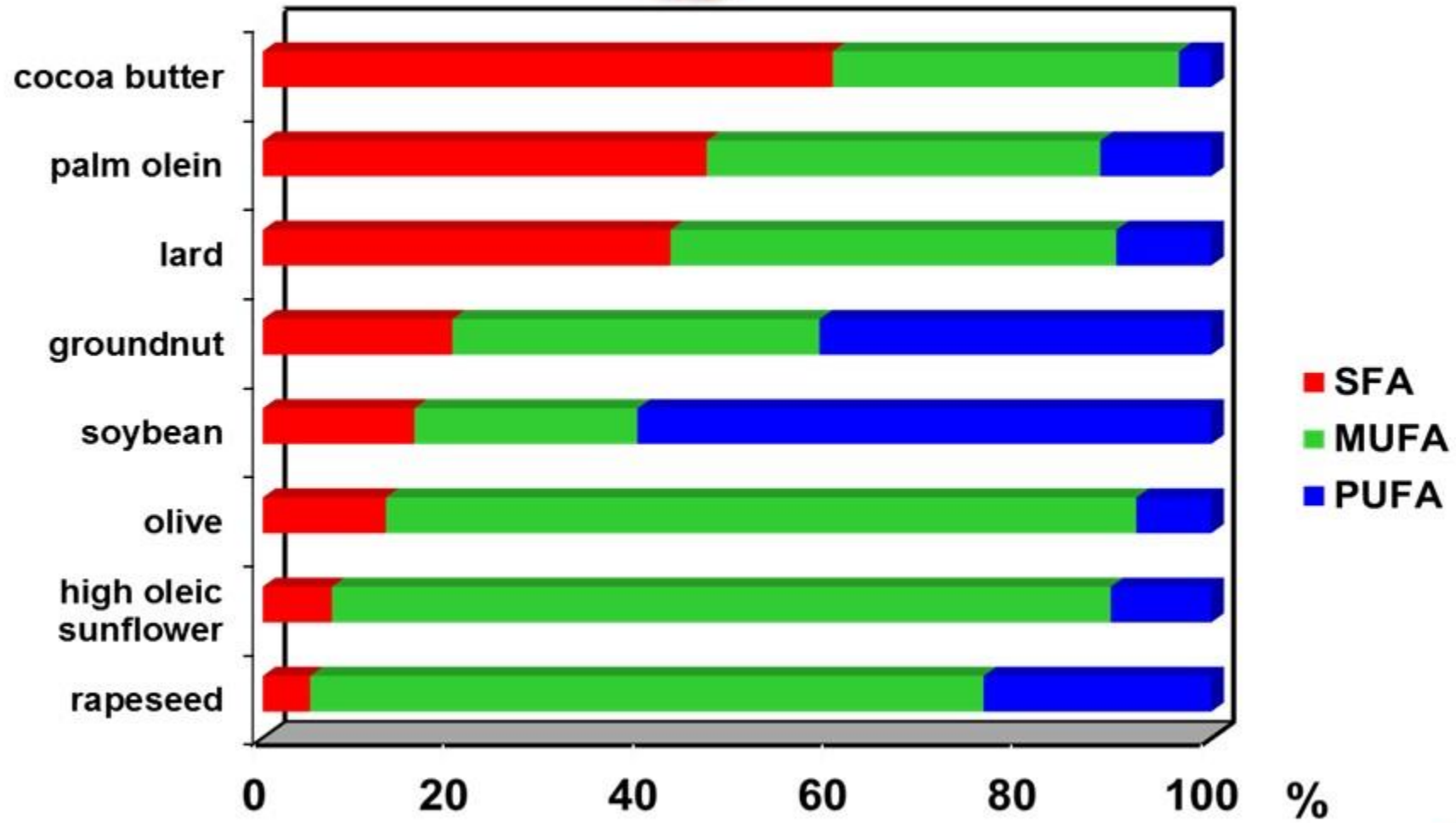
VITAMIN E IN PALM OIL

- Crude oil and red palm oil- highest content of tocotrienols.
- 70% retained in refined oils.
- Mostly in form of γ tocotrienols.
- Antioxidant activity - $\gamma > \delta > \alpha$
- α tocotrienol improve oxidative stability by factor 6.3.

STABILITY OF PALM OIL

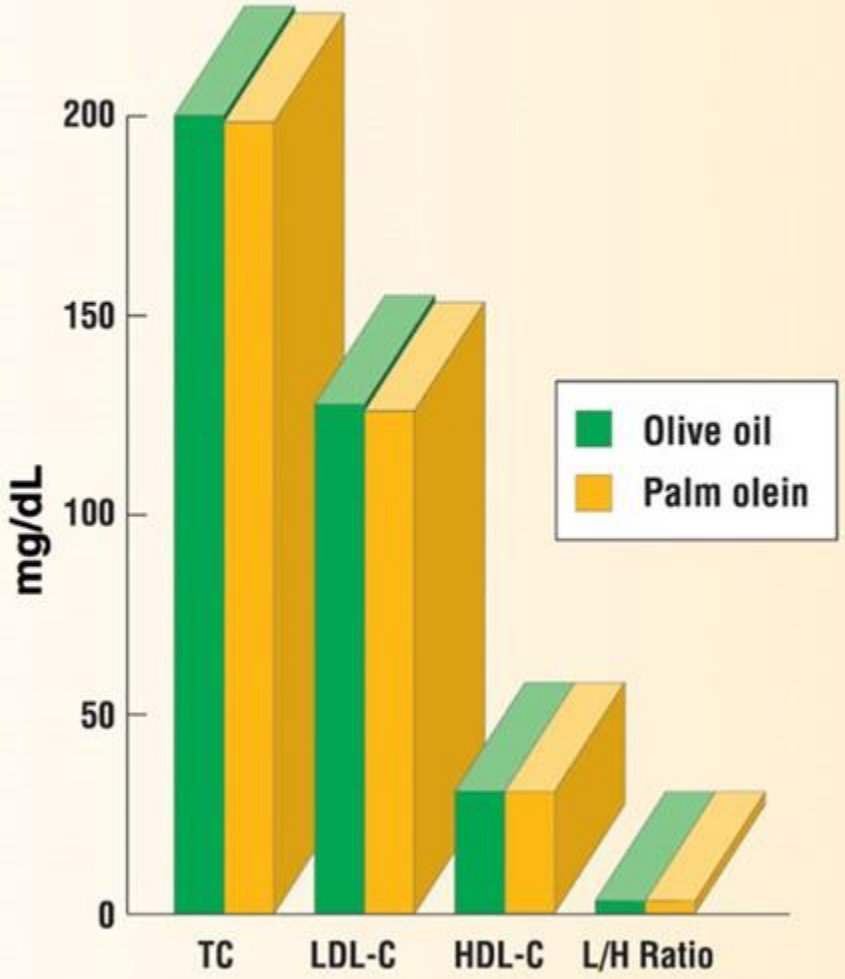
	PH oil	Rapeseed	Palm
Rancimat (120C)	>35	<2	>10
Sat %	12	8	38
Mono %	30	62	47
Poly %	<1	30	15
Trans %	58	<1	<1

TOTAL FATTY ACID COMPOSITION OF OILS & FATS

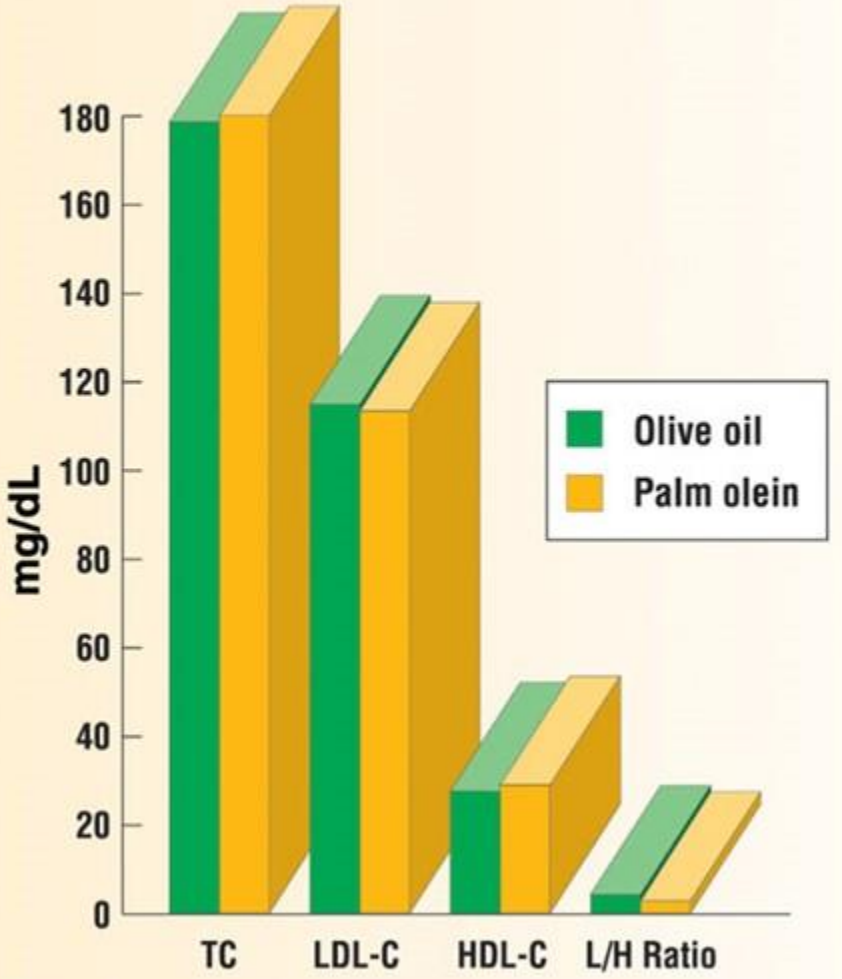


Ong and Goh 2002 FNB

CHOLESTEROL-MODULATING EFFECTS OF PALM OLEIN AND OLIVE OIL ARE COMPARABLE

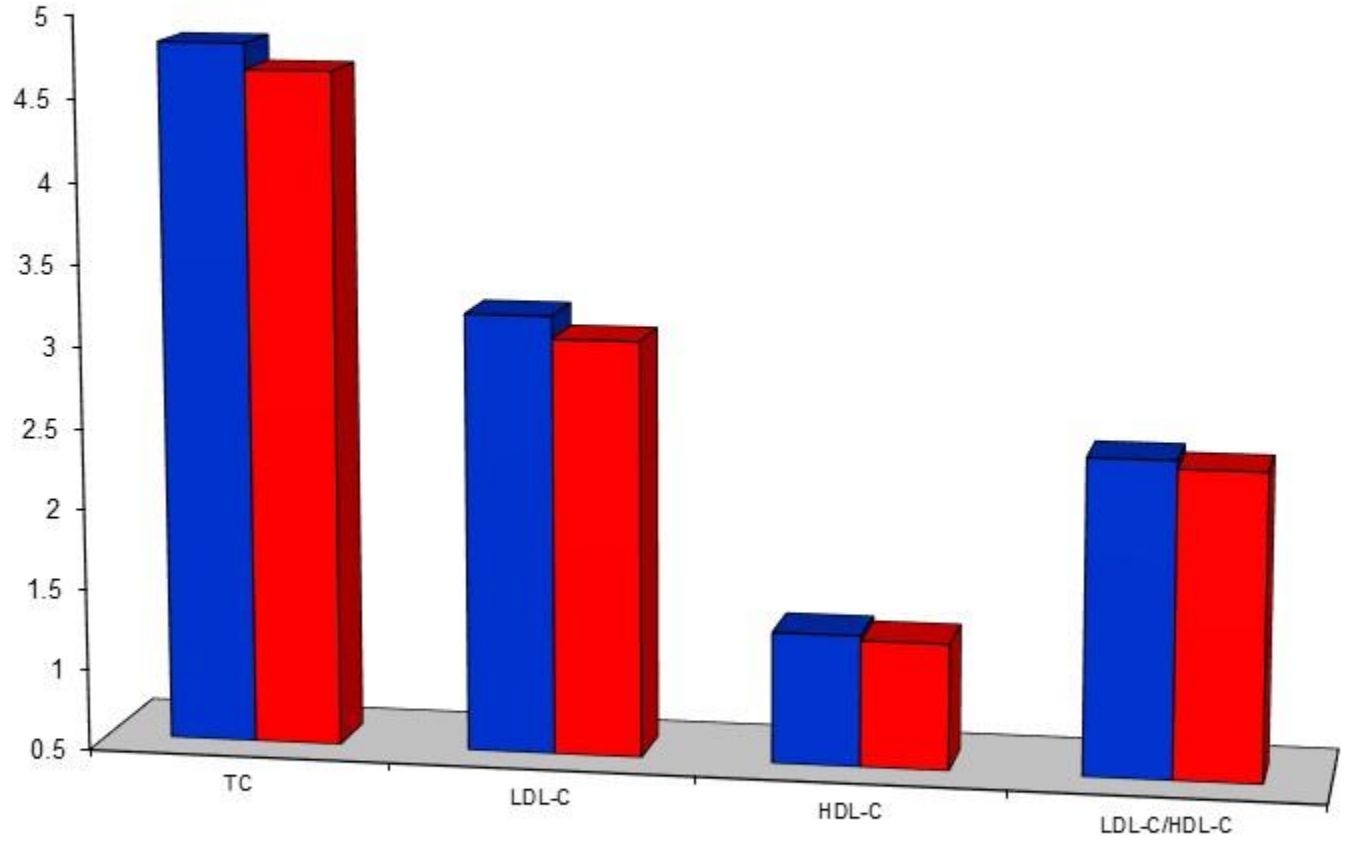


Ref: Ng et al. (1992). J Am Coll Nutr. 11:383-90.



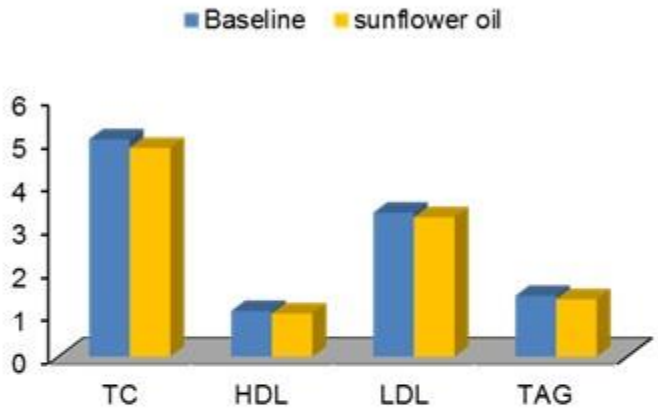
Ref: Choudhury et al. (1995). J Am Clin Nutr. 61:1043-51.

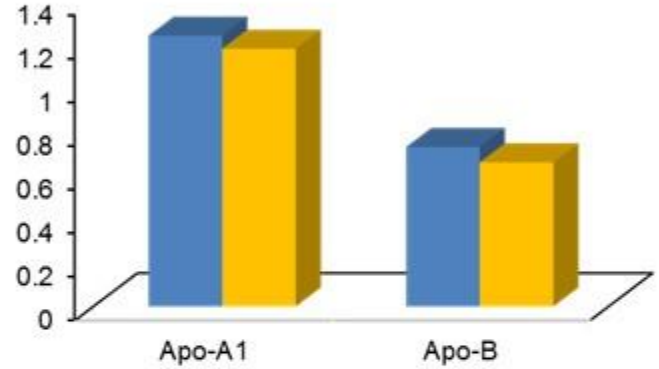
Palm olein and olive oil have similar beneficial effects on blood cholesterol

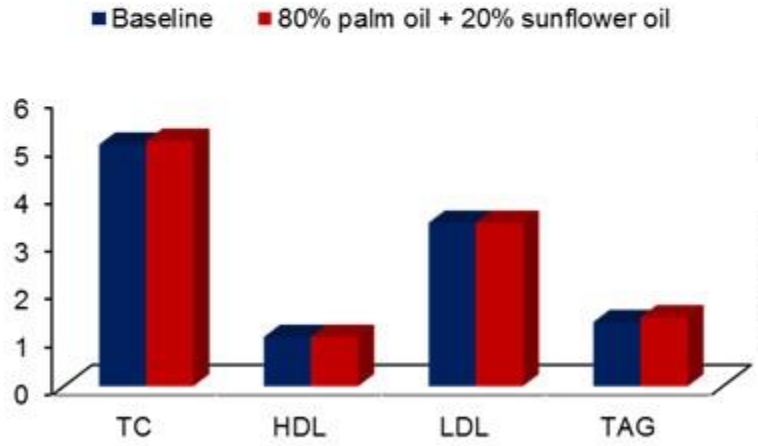


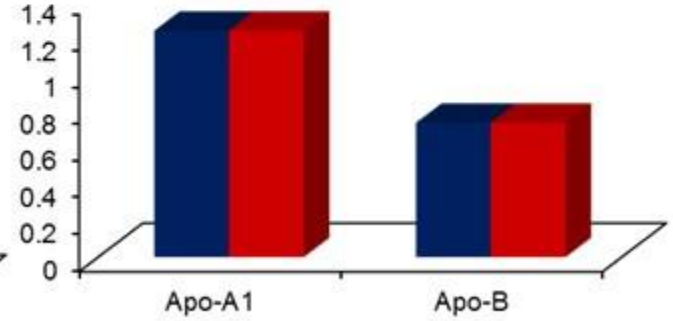
Voon et al. 2011 AJCN

PALM OLEIN VS MUFA OILS





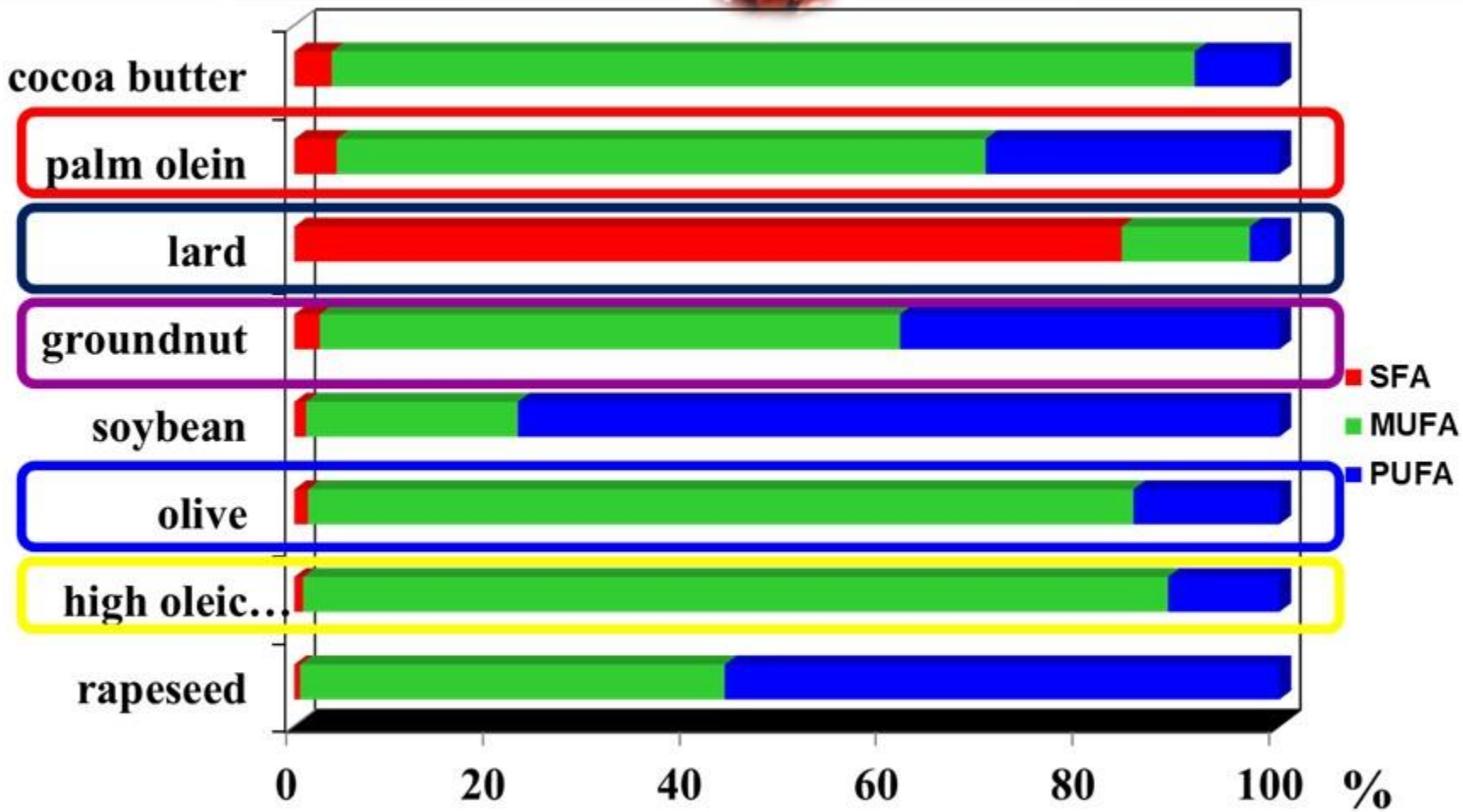




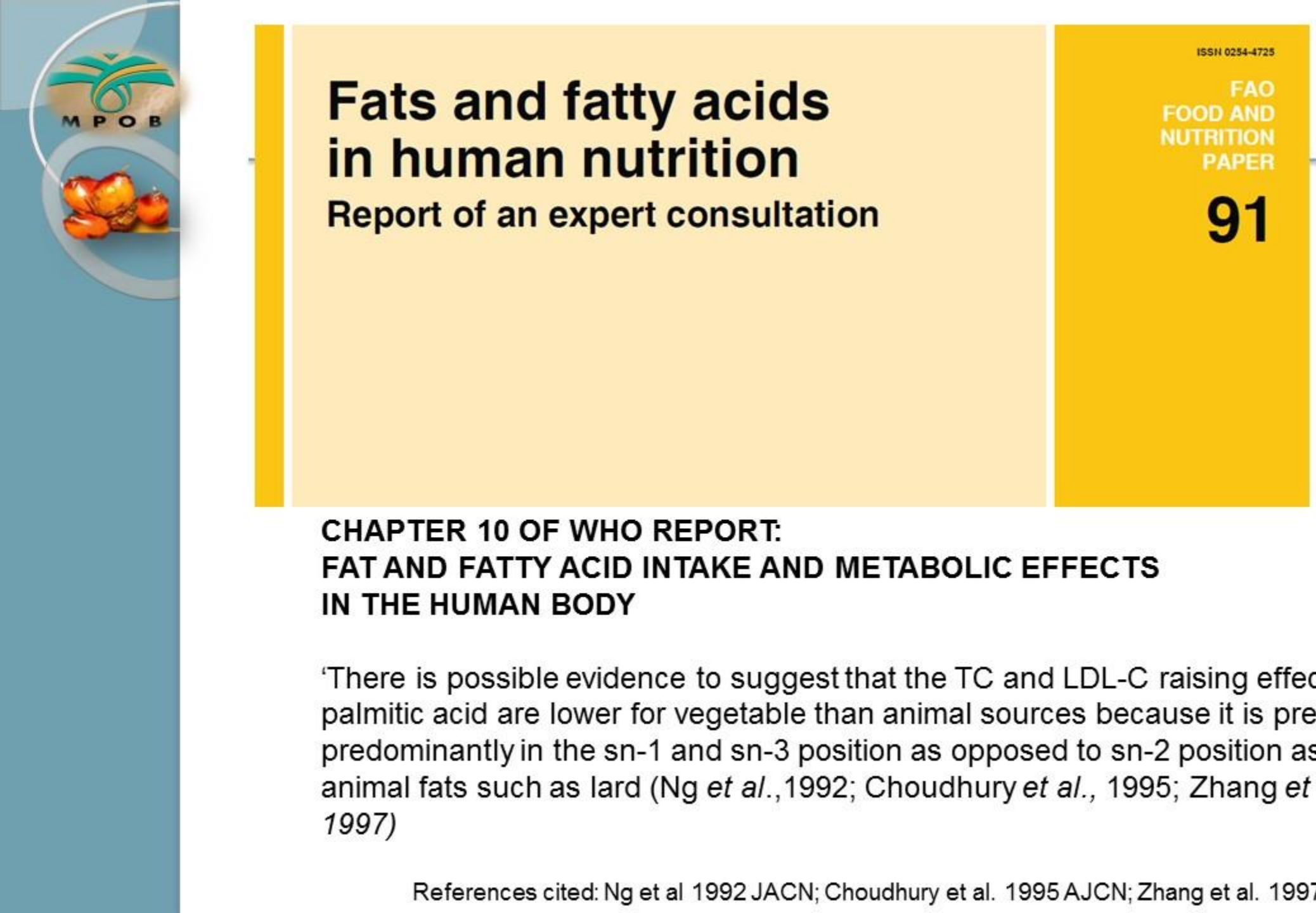
Palm olein is comparable with sunflower oil on lipid profile

Wood et al. 1993 J Nutr Biochem

sn-2 FATTY ACID COMPOSITION



Ong and Goh 2002 FNB; Sanders et al. 2011 AJCN



CHAPTER 10 OF WHO REPORT:
FAT AND FATTY ACID INTAKE AND METABOLIC EFFECTS IN THE HUMAN BODY

'There is possible evidence to suggest that the TC and LDL-C raising effects of palmitic acid are lower for vegetable than animal sources because it is present predominantly in the sn-1 and sn-3 position as opposed to sn-2 position as in animal fats such as lard (Ng *et al*.,1992; Choudhury *et al.,* 1995; Zhang *et al., 1997)*

References cited: Ng et al 1992 JACN; Choudhury et al. 1995 AJCN; Zhang et al. 1997 APJCN

Authors	Journals	Title	Conclusion
Patty W Siri-Tarino, Qi Sun, Frank B Hu, and Ronald M Krauss	Am J Clin Nutr. 2010 Mar; 91(3): 535–546. Published online 2010 Jan 13. doi: 10.3945/ajcn.2009.27725	Meta-analysis of prospective cohort studies evaluating the association of saturated fat with cardiovascular disease	A meta-analysis of prospective epidemiologic studies showed that ther is no significant evidence for concluding that dietary saturated fat is associated with an increased risk of CHD or CVD
Patty W Siri-Tarino, Qi Sun, Frank B Hu, and Ronald M Krauss	Am J Clin Nutr. 2010 Mar; 91(3): 502–509. Published online 2010 Jan 20. doi: 10.3945/ajcn.2008.26285	Saturated fat, carbohydrate, and cardiovascular disease	Particularly given the differential effects of dietary saturated fats and carbohydrates on concentrations of larger and smaller LDL particles, respectively, dietary efforts to improve the increasing burden of CVD risk associated with atherogenic dyslipidemia should primarily emphasize the limitation of refined carbohydrate intakes and a reduction in excess adiposity.
James J DiNicolantonio	Open Heart 2014;1: doi:10.1136/openhrt-2013-000032	The cardiometabolic consequences of replacing saturated fats with carbohydrates or Ω-6 polyunsaturated fats: Do the dietary guidelines have it wrong?	In summary, the benefits of a low-fat diet (particularly a diet replacing saturated fats with carbohydrates or Ω-6 polyunsaturated fatty acids) are severely challenged. Dietary guidelines should assess the totality of the evidence and strongly reconsider their recommendations for replacing saturated fats with carbohydrates or Ω-6 polyunsaturated fat
Aseem Malhotra	BMJ 2013; 347 doi: http://dx.doi.org/10.1136/bmj.f6340 (Published 22 October 2013) Cite this as: BMJ 2013;347:f6340	Saturated fat is not the major issue	Recent prospective cohort studies have not supported any significant association between saturated fat intake and cardiovascular risk. Instead, saturated fat has been found to be protective. It is time to bust the myth of the role of saturated fat in heart disease and wind back the harms of dietary advice that has contributed to obesity
Sara Holmberg , Anders Thelin and Eva-Lena Stiernström	Int. J. Environ. Res. Public Health 2009, 6, 2626-2638; doi:10.3390/ijerph6102626	Food Choices and Coronary Heart Disease: A Population Based Cohort Study of Rural Swedish Men with 12 Years of Follow-up	In conclusion, daily intake of fruit and vegetables combined with a medium-high intake of dairy fat was associated with a lower risk of coronary heart disease in this prospective population-based cohort of 1,752 rural men.
Nathalie Genevieve Puaschitz, et al	J. Nutr. February 1, 2015 jn.114.203505	Dietary Intake of Saturated Fat Is Not Associated with Risk of Coronary Events or Mortality in Patients with Established Coronary Artery Disease	There was no association between dietary intake of SFA and incident coronary events or mortality in patients with established CAD

Facts About Palm Oil

Sustainable

- *The only vegetable oil with internationally recognized sustainable certifications – ISCC, RSPO, MSPO*

Natural

- *Free of GMO, almost organic (minimum use of chemicals)*
- *Expeller-pressed oil*

Versatile

- *Semi-solid*
- *Naturally stable – excellent for frying*

Healthy

- *Well-balanced natural oil with unique composition of fatty acids (50:50)*
- *Free of trans fatty acid*
- *Contains vitamin E, Carotenoids & other phytonutrients*
- *Cholesterol free*

Most cost effective raw material - price and quality

Consistent and abundance in supply

EVENT OF THE YEAR

GOFF 9

GLOBAL OILS & FATS FORUM 2015

Oils & Fats Market Watch

Advancing Sustainability & Sustenance

Oct. 14 & 15, 2015 · Los Angeles, CA

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Thank you